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ABSTRACT

The purpose of this study was to examine Turkish high school students' perceptions of learning environment in biology classrooms and to investigate relationships between learning environment and students' attitudes toward biology. Secondly, the study aimed to investigate the differences in students' perceptions of learning environments in biology classrooms by gender, grade levels, and academic achievement. A total of 399 ninth and tenth grade students participated in the study. Data were collected utilizing an adapted version of the "What is Happening in This Classroom" (WIHIC) instrument and Biology Attitude scale. Data analyses indicated that Turkish high school students generally had positive perceptions of biology classroom environments and there is a positive association between the nature of the biology classroom environment with respect to teacher support, involvement, task orientation, equity and the students' attitudes toward biology. In addition, results of the study revealed that there were significant differences in the perceptions of biology learning environment by gender. (Author)

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Running head: STUDENTS' PERCEPTION OF LEARNING ENVIRONMENT

Turkish High School Student's Perceptions of Learning Environment in Biology Classrooms and their Attitudes toward Biology

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Abstract

The purpose of this study was to examine Turkish high school students' perceptions of learning environment in biology classrooms and to investigate relationships between learning environment and students' attitudes toward biology. Secondly, the study aimed to investigate the differences in students' perceptions of learning environments in biology classrooms by gender, grade levels and academic achievement. A total of 399 ninth and tenth grade students participated in the study. Data were collected utilizing an adapted version of the "What is Happening in These Classroom" (WIHIC) instrument and Biology Attitude scale. Data analyses indicated that Turkish high school students generally had positive perceptions of biology classroom environments and there is a positive association between the nature of the biology classroom environment with respect to teacher support, involvement, task orientation, equity and the students' attitudes toward biology. In addition, results of the study revealed that there were significant differences in the perceptions of biology learning environment by gender.

Introduction

The classroom is a learning environment where interactions occur among students, teachers, and learning takes place (Talton & Simpson, 1987). The role of the classroom environment in influencing cognitive and affective outcomes has been addressed by many researchers (Fraser & Fisher 1982; Fraser et al., 1987, Haertal, Walberg & Haertal, 1981). Recent research has shown that a strong link exists between student outcomes and their perceptions of their learning environment (Fraser & Butts, 1982; Fraser & Fisher, 1982, 1983; Haladyne et al., 1982; Talton & Simpson, 1987). In his review of past studies, Fraser (1998) stated that associations between outcome measures and classroom environment perceptions have been replicated for variety of cognitive and affective outcome with variety of instruments, across numerous countries and grade levels. Recent classroom environment research has focused on constructivist classroom environments (Taylor, Fraser & Fisher, 1997), cross-national studies of science classroom environments (Aldridge, Fraser, & Huang, 1999), science laboratory classroom environments (McRobbie & Fraser, 1993), computer laboratory classroom environment (Newby & Fisher, 2000) and computer-assisted instruction classrooms (Teh & Fraser, 1994).

Researchers studying classroom environments have been developing various approaches for collecting data over the years. A number of instruments have been developed and used to measure the qualities of classroom learning environment from the perspectives of the students (Fraser, 1998). Early instruments used in the educational learning environment include the Learning Environment Inventory (LEI), The My Class Inventory (MCI) and Questionnaire on Teacher Interaction (QTI). Based on the previous studies, Fraser, Fisher, and McRobbie (1996) developed a learning environment instrument called "What Is Happening In This Class?" (WIHIC) which incorporates scales that have been used previously. This questionnaire was used by many researchers from different countries to collect data about

classroom environment. The studies in Singapore and Brunei validated an English version of the WIHIC questionnaire, whereas the study in Korea validated a Korean version of the questionnaire. The findings in each study replicated those of past studies, reporting strong associations between the learning environment and students outcomes for almost all scales.

Although the most classroom environment research involved students in Western countries, a number of important studies have been carried out in non-Western countries (Fraser, 1998). Studies in India (Walberg et al., 1977), Thailand (Fraser, 1984), Indonesia (Schibeci et al, 1987), Singapore (Chonj & Fraser, 1998; Wong & Fraser, 1996), Hong Kong (Chong, 1994) and Brunei (Riah & Fraser, 1998) replicated previous research and suggested that the psychosocial climate of classrooms is an important determinant of students' outcomes. Although large body of research exists on the subject of learning environment in other countries, less has been done in Turkey.

Purpose

The purpose of this study was to examine Turkish high school students' perceptions of learning environment in biology classrooms and to investigate relationships between learning environment and students' attitudes toward biology. Secondly, the study aimed to investigate the differences in students' perceptions of learning environments in biology classrooms by gender, grade levels and academic achievement.

Brief Background Information about Turkish Education System

All educational intuitions in Turkey are under the control of the Ministry of National Education. The Educational system consists of 3 main components: basic, secondary and higher education. Basic education which begins at the age of 6, is eight years, compulsory, and free of charge in public schools. Every student who complete his or her basic education is eligible for secondary education. Secondary education, which comprises general, Anatolian, science, vocational, and technical high schools, is 3 years and like basic education, is free

charge in public schools (Ayas, Cepni & Akdeniz 1993). The students who graduate from basic education may take the Secondary Education Selection and Placement Examination (SESPE) to enrol in the Science high schools and Anatolian high schools. These two types of high schools are considered to be more prestigious by the public and select students with high scores in SESPE. There are many factors affecting the demand among the candidates graduated from basic education institutions who want to continue to these secondary education institutions. To gain a profession, to prepare for scientific and academic study, to have a diploma and to prepare for better universities in Turkey and abroad are some of the reasons for taking SESPE. In high schools, the average number of weekly periods of teaching in each grade varies from a minimum of 33 to a maximum of 41. The school year at secondary level comprises of 180 working days and two terms. The subjects taught in secondary education are grouped as follows:

a) general subjects which are compulsory for all students;

b) subjects which vary according to the branch considered;

c) Elective subjects which also vary according to the branch considered.

In the secondary education common general subjects usually include: Turkish language and literature, religious culture and ethics, history, geography, mathematics, biology, physics, chemistry, hygiene, foreign language, and physical education. At the end of secondary education, students are awarded by a diploma.

Method

Sample

A total of 399 ninth and tenth grade students from 10 biology classes of one of the high schools in Bursa in Turkey participated in this study. Among these students, about 50 % were girls.

Instruments

Data were collected utilizing the What Is Happening in This Class? (WIHIC) (Fraser, Fisher, & McRobbie, 1996) and Biology Attitude Scale. The WIHIC questionnaire was used to assess students' perceptions of their biology learning environment. The WIHIC consists of 7 scales and 56 items (Fraser, Fisher, & McRobbies, 1996). The seven scales are Student Cohesiveness, Teacher Support, Involvement, Investigation, Task Orientation, Cooperation and Equity (Table 1). Each of the seven scales includes 8 items. The questionnaire was translated and adapted into Turkish by the researchers. The next step involved an independent back translation of the Turkish version into English by two qualified, bilingual Turkish graduate students who were not involved in the original translation. Then the Turkish researchers checked the back translations and, for some items, necessary modifications in the Turkish translation were carried out. A factor analysis suggests the factorial structure of the WIHIC developed by Fraser et al. (1996) was the same as that which was observed for the Turkish sample. The reliability coefficient for different WIHIC scales ranged from 0.75 to 0.90.

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Insert Table 1 about here

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Students' attitudes toward biology were assessed using Biology Attitude scale (Geban et al., 1994) which is a 15 items, 5-point Likert type scale. The alpha reliability coefficients of the scale was found to be 0.92.

The instruments were administered to students toward the end of school year.

Results

Data analyses indicated that Turkish high school students generally had positive perceptions of biology classroom environments. Task Orientation scale has the highest mean

(M=4.05), followed by Students Cohesiveness scale (M=3.93). On the other hand, Teacher Support scale has the lowest mean (M=2.57), followed by Investigation scale (M=3.20) (Figure 1).

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Insert Figure 1 about here

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The relationship between biology classroom environments as measured by the WIHIC scales and students' attitudes toward biology was explored by Pearson product moment correlation coefficients. Of the seven scales of the WIHIC questionnaire only 5 scales (Teacher Support, Involvement, Investigations, Task Orientation, and Equity) were found to be significantly correlated ($p<0.01$) with students' attitudes toward biology (Table 2). This means that there is a positive association between the nature of the biology classroom environment with respect to teacher support, involvement, task orientation, equity and the students' attitudes toward biology.

Furthermore, data analysis indicated that all six scales of the WIHIC questionnaire (except investigations) were found to be significantly and positively correlated ($p<0.01$) with the GPA of the students. This result suggests that students with higher GPAs tend to have positive perceptions of learning environment.

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Insert Table 2 about here

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T-test results revealed that there were significant differences in the perceptions of biology learning environment by gender. Girls had more positive perceptions as well as attitudes toward biology than boys (Table 2).

Similarly, t-test was also used to determine the ability of each WIHIC scale to differentiate between the perceptions of students in different grade levels. It was found that ninth grade students had more positive perceptions in two scales of WIHIC questionnaires (Students Cohesiveness, Teacher Support) and attitudes toward biology (Table 3).

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Insert Table 3 about here

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Insert Table 4 about here

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Discussion

This study provided insights into biology classroom environment in this particular school in Turkey. It investigated the relationships between students' perceptions of classroom learning environment and their attitudes towards biology. The results of the study indicated that participating high school students had favourable perceptions of their learning environment in biology classrooms.

The data collected from this study indicated that the students in the biology classroom generally perceived that they had greater task orientation and student cohesiveness. This may be a result from the existence of exam oriented education system in Turkey. The participants involved in this study took the Secondary Education Selection and Placement Examination (SESPE) to enroll in this type of school named Anatolian high schools. Anatolian high school students generally are selected among the highest scored students in SESPE after eight years compulsory education. Beside this these students will take University Entrance Examination once they graduate the high school. In addition, these students generally have high expectations about being accepted by a good university for a good career and job

opportunities for their future. These may partly explain why the participants perceive classroom environment as more task oriented. Moreover, students in this high school usually take all the courses with the same group of peers. Students continue to study with the same group in their entire high school education. This type of grouping may indicate why they had greater perceptions with regard to student cohesiveness.

On the other hand, the analysis of data revealed that the students generally perceived that they had lower teacher support and investigation in the biology classroom. Since the size of the classroom in which the study was conducted was around 40-45 students, this may negatively influence the teacher support and conducting investigation. For this size of class, it is not always possible for a teacher to effectively interact with students, to consider their feeling, to talk, and to pay personal attention to each student. In addition, due to the exam oriented education system, both students and teachers do not want to spend their time for laboratory and library work and conducting investigations. Their main tendency is to cover subjects rapidly instead of giving time for laboratory investigation and they use their time and capacity more on practicing the question types which are asked on university entrance exam.

Analysis of data indicated an association between five subscales of WIHIC instruments with attitudes toward biology. In other words, the students who had higher attitudes towards biology tended to perceive biology classroom environment as teacher supported, task oriented, considering equity, including student involvement and investigations.

Furthermore, gender was found to be a significant factor that differentiates students' perceptions of biology learning environments. This finding supports the previous research that found the girls perceive more favourably of their classroom environments than boys. (Huang & Waxman, 1995; Waxman & Huang, 1998). For example, according to Mok (2002) female students had both higher developmental expectations of their schools and more positive perceptions of the classroom atmosphere. In turn students with higher developmental

expectations perceived their classroom more positively than did those with lower expectations.

The classroom is the basic unit of organization of our educational system. By continuing to increase our knowledge of the interactions that occur within the classroom, we shall be able to enhance our understanding of this important educational unit. As we increase our understanding of how students, teachers and science come together within the classroom environment, we should be able to improve the quality o science education in Turkey. It has been assumed that having a positive classroom environment is an educationally desirable end in its own right. This study provides biology teachers with information about aspects of the learning environment that, if altered, could lead to increases in students' attitudinal and achievement gains. The practical implication of this research is that student outcomes might be improved by creating classroom environments found empirically to be conducive to learning. Understanding students' perceptions of their classroom learning environments and the factors associated with their perceptions may help us to find out some alternative ways that enhance the student's learning. Findings of this study identified gender and academic achievement and grade levels variables as factors that predict learning environment perceptions. For that reason, educational researchers in Turkey should focus on the disparities between boys and girls and find strategies that may create positive and productive learning environment for boys. Furthermore, educators should recognize the importance of creating supportive, stimulating, enjoyable and productive learning environment.

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Table 1

Dimensions of WIHIC Questionnaire

Scales	Description
Student Cohesiveness	extent to which students know, help, and are supportive of one another
Teacher support	extent to which the teacher helps, be friends, trusts, and shows interest in students
Involvement	extent to which students have attentive interest, participate in discussions, perform additional work, and enjoy the class
Investigation	emphasis on the skills and processes of inquiry and their use in problem solving and investigation
Task orientation	extent to which it is important to complete activities planned and to stay on the subject matter
Cooperation	extent to which students cooperate rather than compete with one another on learning tasks
Equity	extent to which students are treated equally by the teacher

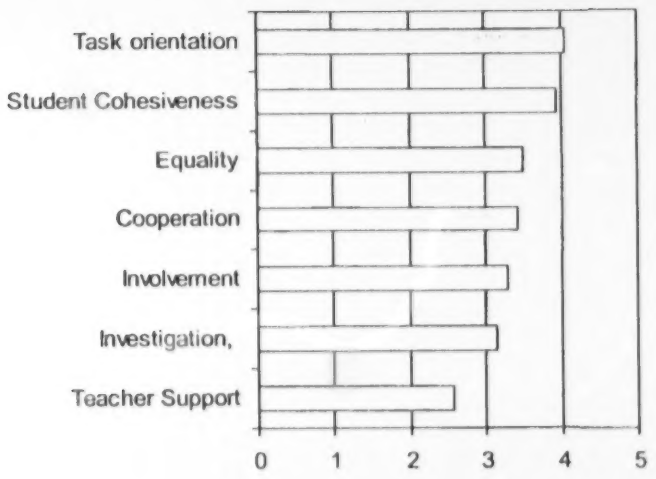

Figure 1. Mean of WIHICH Sub dimensions

Table 2

Pearson Product-Moment Correlations of the WIHIC Scales, Attitudes and GPA

	Attitude	GPA
Student Cohesiveness	-.02	.14*
Teacher Support	.34*	.12*
Involvement	.18*	.21*
Investigation	.37*	.04
Task Orientation	.17*	.35*
Cooperation	.02	.15*
Equity	.28*	.18*

* $p<0.01$

Table 3

T-Test Results: Girls versus boys on the scales of the WIHICH

Scales	Girls	Boys	t
Student Cohesiveness	4.00	3.86	2.36*
Teacher Support	2.73	2.43	3.70**
Involvement	3.35	3.19	2.16*
Investigation	3.17	3.09	1.15
Task Orientation	4.21	3.89	4.83**
Cooperation	3.59	3.25	4.18**
Equity	3.63	3.35	3.11**
Attitude	3.41	3.10	3.96**

Note. The maximum possible mean score was 5 and the minimum possible mean score was 1.

* $p<.05$. ** $p<.001$.

Table 4

T-Test Results: Ninth versus Tenth grade students on the scales of the WIHICH

Scales and Attitude	9th Grade	10th Grade	*t*
Student Cohesiveness	4.01	3.81	3.06**
Teacher Support	2.66	2.44	2.61**
Involvement	3.32	3.19	1.59
Investigation	3.15	3.10	0.69
Task Orientation	4.08	4.00	1.14
Cooperation	3.45	3.37	0.96
Equity	3.55	3.38	1.78
Attitude	3.36	3.10	3.17**

Note. The maximum possible mean score was 5 and the minimum possible mean score was 1.

** $p<.001$.

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